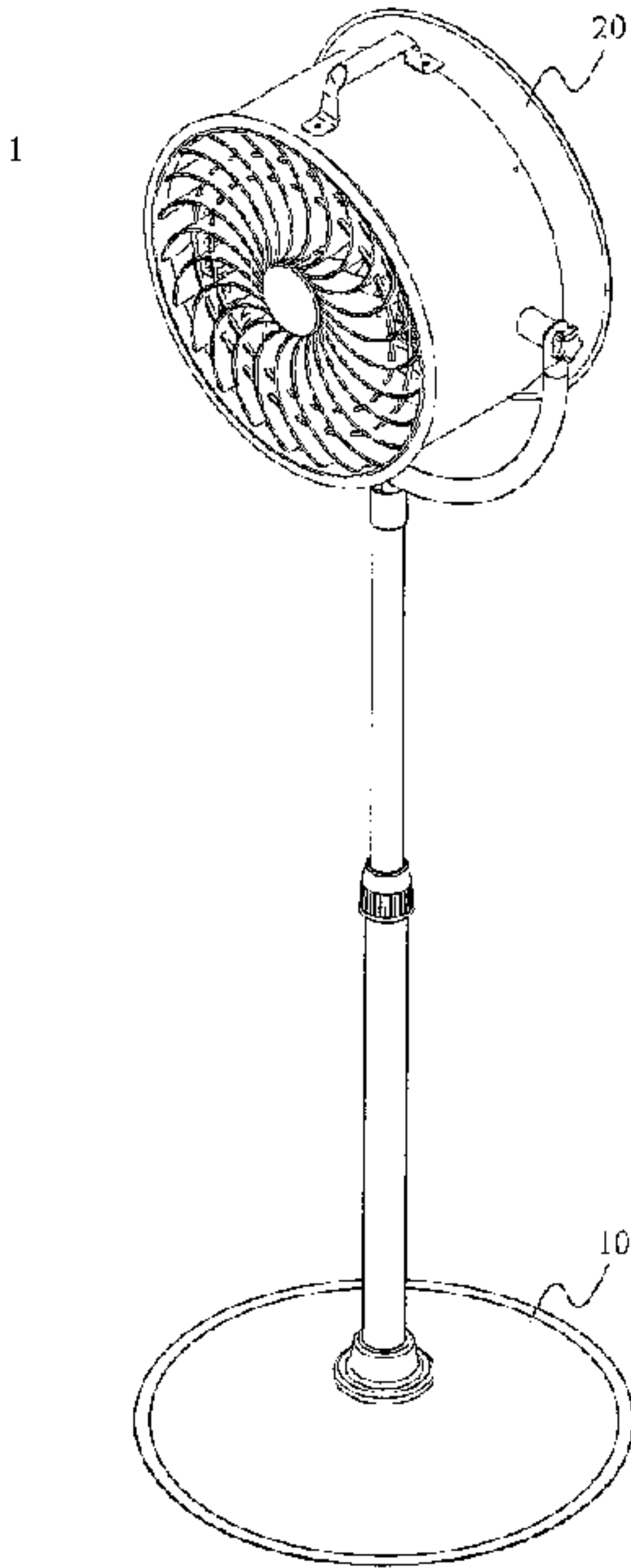




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(54) Titre : COMBINAISON DE STRUCTURE DE VENTILATEUR REFROIDISSANT ET CHAUFFANT
(54) Title: COMBINATION COOLING AND HEATING FAN STRUCTURE



(57) **Abrégé/Abstract:**
A combination cooling and heating fan structure includes an electronic device for controlling a driving device to drive a fan blade assembly to rotate within a first rotational speed range and thereby cause cold convection when the driving device is started alone. The electronic device includes a limiting module for limiting the driving device to rotate within a second rotational speed range, which is smaller than the first rotational speed range, when the driving device and a heating device are started at the same time. That is, when the driving device and the heating device are started simultaneously, the limiting module limits the driving device to rotate within the second rotational speed range for the fan blade assembly to blow hot air through an indoor environment and cause heat convection, which increases the temperature of the indoor environment while preventing quick loss of thermal energy during the heat convection.

ABSTRACT OF THE DISCLOSURE

A combination cooling and heating fan structure includes an electronic device for controlling a driving device to drive a fan blade assembly to rotate within a first rotational speed range and thereby cause cold convection when the driving device is started alone. The electronic device includes a limiting module for limiting the driving device to rotate within a second rotational speed range, which is smaller than the first rotational speed range, when the driving device and a heating device are started at the same time. That is, when the driving device and the heating device are started simultaneously, the limiting module limits the driving device to rotate within the second rotational speed range for the fan blade assembly to blow hot air through an indoor environment and cause heat convection, which increases the temperature of the indoor environment while preventing quick loss of thermal energy during the heat convection.

COMBINATION COOLING AND HEATING FAN STRUCTURE

FIELD OF THE INVENTION

5 [0001] The present invention relates to a combination cooling and heating fan structure, and more particularly to a combination cooling and heating fan structure that can limit a driving device and a fan blade assembly thereof to rotate at a reduced rotational speed when a heating device of the fan structure is started to produce hot air.

10 BACKGROUND OF THE INVENTION

[0002] The progress of industrial techniques also brings the problem of global warming that is getting worse to cause fierce climate change all over the world, particularly the constantly increased temperature in summer. Most people try to get rid
15 of unbearable heat by using air conditioners or electric fans to lower indoor temperature. Regarding electric fans, they are generally divided into two categories, namely, cooling fans for use in summer and fan heaters for use in winter. A user has to store the cooling fan when winter comes and the fan heater when summer comes. To buy both of the cooling fan and the fan heater obviously increases a consumer's burden, and the cooling
20 fan or fan heater that is seasonally not in use requires additional space for storage. To overcome the above problems, a dual fan cooler and heater capable of selectively producing cooling or hot air has been developed and introduced into the market.

[0003] The currently commercially available dual fan cooler and heater includes a
25 heating device, which heats air surrounding it to produce hot air, and a fan blade

assembly, which rotates to blow the produced hot air through an indoor environment to gradually increase the temperature of the indoor environment. It is noted the rotational speed of the fan blade assembly will indirectly extend or shorten the time needed to increase the indoor temperature. When a user increases the rotational speed of the fan
5 blade assembly to enhance air convection in the indoor environment, the temperature of the produced hot air will inevitably reduce more quickly, and more time is needed to increase the indoor temperature.

[0004] In view of the disadvantages of the currently available dual fan cooler and
10 heater, it is desirable to provide an improved combination cooling and heating fan structure that is able to limit a driving device thereof to rotate within a specific rotational speed range when the fan structure blows hot air in an indoor environment, so as to avoid quick loss of heat energy of the hot air and to shorten the time needed to increase the temperature of the indoor environment.

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SUMMARY OF THE INVENTION

[0005] A primary object of the present invention is to provide a combination cooling and heating fan structure, which is able to limit a driving device thereof to rotate within
20 a specific rotational speed range when the fan structure blows hot air in an indoor environment, so as to effectively avoid quick loss of heat energy of the hot air and to shorten the time needed to increase the temperature of the indoor environment.

[0006] To achieve the above and other objects, the combination cooling and heating
25 fan structure according to the present invention includes a driving device, a heating

device and an electronic device. The driving device drives a fan blade assembly to rotate; the heating device is able to produce hot air; and the electronic device is electrically connected to the driving device and the heating device and includes a regulating unit, a processing unit and a limiting module.

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[0007] The regulating unit of the electronic device can control the driving device to rotate within a preset first rotational speed range to thereby drive the fan blade assembly of the fan structure to rotate and cause cold convection. The regulating unit can also selectively increase or reduce the rotational speed of the driving device within
10 the first rotational speed range. The processing unit of the electronic device can control the heating device to produce hot air. The limiting module of the electronic device can limit the driving device to rotate within a second rotational speed range, which is smaller than the first rotational speed range, so that the fan blade assembly blows the produced hot air to cause heat convection.

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[0008] According to a preferred embodiment of the present invention, the limiting module includes a speed-limiting unit and a current-dividing unit. The speed-limiting unit is electrically connected to the driving device for limiting the driving device to rotate at a speed within the second rotational speed range. The current-dividing unit is
20 electrically connected to the processing unit, the regulating unit, the speed-limiting unit and the heat device for selectively transmitting an external power supply to only the regulating unit or to both of the speed-limiting unit and the heating device. And, the speed-limiting unit and the current-dividing unit together form the limiting module.

25 [0009] In the above embodiment, the processing unit generates a first control signal to

the current-dividing unit when only the driving device is started, so that the current-dividing unit having received the first control signal transmits the external power supply to only the regulating unit. On the other hand, the processing unit generates a second control signal to the current-dividing unit when both of the driving
5 device and the heating device are started, so that the current-dividing unit having received the second control signal transmits the external power supply to both of the speed-limiting unit and the heating device.

[0010] According to another preferred embodiment of the present invention, the
10 limiting module includes a suppressing unit and a current-dividing unit. The suppressing unit is electrically connected to the regulating unit and the processing unit for suppressing the regulating unit, so that the regulating unit can increase or reduce the rotational speed of the driving device only within the second rotational speed range. The current-dividing unit is electrically connected to the regulating unit and the heating
15 device for selectively transmitting an external power supply to only the regulating unit or to both of the regulating unit and the heating device. And, the suppressing unit and the current-dividing unit together form the limiting module.

[0011] In the above embodiment, the processing unit generates a first control signal to
20 the current-dividing unit, so that the current-dividing unit starts only the driving device via the regulating unit and limits the driving device to rotate at a speed within the first rotational speed range. On the other hand, the processing unit generates a second control signal to both of the current-dividing unit and the suppressing unit, so that the driving unit rotates at a speed within the second rotational speed range and the heating
25 device is driven to produce hot air.

[0012] In the above two preferred embodiments, the current-dividing unit and the processing unit together constitute a microprocessor. According to a further preferred embodiment of the present invention, the combination cooling and heating fan structure further includes a wireless receiver module electrically connected to the electronic device and a sensing device electrically connected to the electronic device. The wireless receiver module is wirelessly connected to a portable mobile device, so that the portable mobile device can remotely start the driving device and the heating device via the wireless receiver module.

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[0013] The sensing device detects different physical quantities in an indoor environment. The electronic device is caused to turn off the driving device and the heating device when the sensing device detects any specific physical quantity is higher or lower than a preset value. In a preferred embodiment, the sensing device includes a temperature sensor unit for sensing an indoor temperature and a humidity sensor unit for sensing an indoor humidity level. The electronic device stops the driving device and the heating device from operating when the temperature sensor unit detects an indoor temperature that is too high relative to a corresponding preset value or the humidity sensor unit detects an indoor humidity level that is too low relative to a corresponding preset value.

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[0014] According to a still further preferred embodiment of the present invention, the driving device includes an oscillating assembly for causing the fan blade assembly to oscillate, and the electronic device is able to selectively control the oscillating assembly to oscillate the fan blade assembly. According to the present invention, the first and the

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second rotational speed range have the same low limit while the first rotational speed range has a high limit larger than that of the second rotational speed range.

[0015] The present invention is characterized in that, when the driving device and the heating device are started simultaneously, the limiting module of the electronic device limits the driving device to rotate within the second rotational speed range for the fan blade assembly to blow hot air through an indoor environment and cause heat convection, which can effectively increase the temperature of the indoor environment while preventing quick loss of thermal energy during the heat convection.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

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Fig. 1 is an assembled perspective view of a combination cooling and heating fan structure according to a first preferred embodiment of the present invention;

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Fig. 2 is an exploded view of Fig. 1;

Fig. 3 is a block diagram of the combination cooling and heating fan structure according to the first preferred embodiment of the present invention;

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Fig. 4 is a cutaway view showing the combination cooling and heating fan structure according to the first preferred embodiment of the present invention is started to produce currents of cooling air;

5 Fig. 5 is a cutaway view showing the combination cooling and heating fan structure according to the first preferred embodiment of the present invention is started to produce currents of hot air;

Fig. 6 is a block diagram of a combination cooling and heating fan structure according
10 to a second preferred embodiment of the present invention;

Fig. 7 is a perspective view of a combination cooling and heating fan structure according to a third preferred embodiment of the present invention;

15 Fig. 8 is a block diagram of the combination cooling and heating fan structure according to the third preferred embodiment of the present invention;

Fig. 9 is a block diagram of a combination cooling and heating fan structure according to a fourth preferred embodiment of the present invention;

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Fig. 10 is a block diagram of a combination cooling and heating fan structure according to a fifth preferred embodiment of the present invention; and

Fig. 11 shows a housing of the combination cooling and heating fan structure according
25 to the fifth preferred embodiment of the present invention can oscillate up and down.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The present invention will now be described with some preferred embodiments thereof and by referring to the accompanying drawings. For the purpose of easy to understand, elements that are the same in the preferred embodiments are denoted by the same reference numerals.

[0018] Please refer to Figs. 1 and 2. A combination cooling and heating fan structure 1 according to a first preferred embodiment of the present invention includes a base 10 for positioning on a ground or a floor, and a housing 20 movably connected to a top of the base 10. The housing 20 internally defines a receiving space 21 communicable with an environment outside the housing 20. In the housing 20, there are mounted a starting device 30, a driving device 40, a heating device 50, an electronic device 60, and a fan blade assembly 70.

[0019] As shown, the starting device 30 includes a driving start switch 31, which is able to generate a driving start signal to the driving device 40 for the same to start operating, and a heating start switch 32, which is able to generate a heating start signal to the heating device 50 for the same to start heating. The driving device 40 in operating will drive the fan blade assembly 70 to rotate in the receiving space 21. The heating device 50 is mounted in the receiving space 21 to locate in front of the fan blade assembly 70. Further, the heating device 50 is able to heat air inside the receiving space 21 to produce hot air.

[0020] Please refer to Figs. 2 and 3. The electronic device 60 mainly includes a

limiting module 61, a processing unit 62, an AC-to-DC converter 63, and a regulating unit 64. The limiting module 61 is composed of a current-dividing unit 611 and a speed-limiting unit 612. The current-dividing unit 611 is electrically connected to the processing unit 62, the AC-to-DC converter 63, the regulating unit 64, the speed-limiting unit 612 and the heating device 50. The speed-limiting unit 612 is connected to the driving device 40.

[0021] The processing unit 62 is electrically connected to the starting device 30 for receiving the driving start signal and the heating start signal. In the case only the driving start signal is received, the processing unit 62 generates a first control signal to the current-dividing unit 611. On the other hand, in the case both of the driving start signal and the heating start signal are received, the processing unit 62 generates a second control signal to the current-dividing unit 611. In a preferred embodiment of the present invention, the processing unit 62 and the current-dividing unit 611 together constitute a microprocessor 65.

[0022] The regulating unit 64 is electrically connected to the driving device 40, while the AC-to-DC converter 63 is electrically connected to the current-dividing unit 611 of the limiting module 61 to receive an external AC power supply. The AC-to-DC converter 63 functions to convert the external AC power supply into an external DC power supply and transmit the external DC power supply to the current-dividing unit 611 of the limiting module 61. And, the current-dividing unit 611 selectively transmits the received external DC power supply to only the regulating unit 64 or to both of the speed-limiting unit 612 of the limiting module 61 and the heating device 50.

[0023] As shown, when receiving the external DC power supply, the regulating unit 64 transmits the external DC power supply to the driving device 40, so that the fan blade assembly 70 is driven by the driving device 40 to rotate in the receiving space 21 and accordingly cause air therein to flow. The regulating unit 64 can selectively increase or reduce a rotational speed of the driving device 40 within a first rotational speed range. In the illustrated first preferred embodiment, the regulating unit 64 achieves the increase or reduction of the rotational speed of the driving device 40 by changing the resistance of the driving device 40; and the driving device 40 is controlled by the regulating unit 64 to rotate at a speed ranged between 30 and 1400 rpm.

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[0024] When the speed-limiting unit 612 receives the external DC power supply, it transmits the received external DC power supply to the driving device 40, so that the driving device 40 drives the fan blade assembly 70 to rotate in the receiving space 21 and accordingly cause air therein to flow. The speed-limiting unit 612 can limit the driving device 40 to rotate within a second rotational speed range, which is smaller than the first rotational speed range. In the illustrated first preferred embodiment, the first and the second rotational speed range have the same low limit while the first rotational speed range has a high limit larger than that of the second rotational speed range. Further, the speed-limiting unit 612 limits the driving device 40 to rotate within the second rotational speed range by limiting the resistance of the driving device 40 to change within a specific resistance range. Moreover, the driving device 40 is controlled by the speed-limiting unit 612 to rotate at a speed ranged between 30 and 300 rpm.

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[0025] Referring to Figs. 3 and 4. In practical application of the combination cooling and heating fan structure 1 according to the first preferred embodiment of the present

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invention, first turn the driving start switch 31 of the starting device 30 for the driving start switch 31 to generate the driving start signal to the processing unit 62. When receiving the driving start signal only, the processing unit 62 generates the first control signal to the current-dividing unit 611 of the limiting module 61.

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[0026] When receiving the first control signal, the current-dividing unit 611 of the limiting module 61 transmits the external DC power supply to the driving device 40 via the regulating unit 64, so that the fan blade assembly 70 is driven by the driving device 40 to rotate in the receiving space 21 and accordingly causes air therein to flow, which
10 causes cold convection to thereby reduce the temperature of an indoor environment.

[0027] When the driving start switch 31 is turned to different magnitudes of rotational speed, the regulating unit 64 will correspondingly cause changes in the rotational speed of the driving device 40 to increase or reduce an air flow rate of the cold convection. In
15 the illustrated practical application of the present invention, the driving start switch 31 is turned to a rotational speed of 600 rpm, and the regulating unit 64 correspondingly drives the driving device 40 to rotate at a speed of 600 rpm.

[0028] Please refer to Figs. 3 and 5. When it is desired to increase the temperature of
20 the indoor environment, the driving start switch 31 and the heating start switch 32 are turned on at the same time, so that the driving start switch 31 generates the driving start signal to the processing unit 62 while the heating start switch 32 generates the heating start signal to the processing unit 62. When the processing unit 62 receives both of the driving start signal and the heating start signal, it generates the second control signal to
25 the current-dividing unit 611 of the limiting module 61.

[0029] When receiving the second control signal, the current-dividing unit 611 of the limiting module 61 transmits the external DC power supply to the speed-limiting unit 612 and the heating device 50 at the same time. The speed-limiting unit 612 further transmits the received external DC power supply to the driving device 40 for the latter to drive the fan blade assembly 70 to rotate in the receiving space 21. And, the rotation of the fan blade assembly 70 causes indoor air to flow.

[0030] Meanwhile, when the heating device 50 receives the external power supply, it starts heating the air in the receiving space 21 to produce hot air, which is blown by the fan blade assembly 70 into the indoor environment to cause heat convection to thereby increase the temperature of the indoor environment. Since the speed-limiting unit 612 can limit the driving device 40 to rotate within the second rotational speed range, the driving device 40 will drive the fan blade assembly 70 to rotate at a low speed and slowly blows the produced hot air into the indoor environment, which effectively prevents quick loss of thermal energy during the heat convection and shortens the time needed to increase the indoor temperature. In the illustrated practical application of the present invention, the speed-limiting unit 612 limits the driving device 40 to rotate at a speed ranged between 30 and 300 rpm, so that the driving device 40 drives the fan blade assembly 70 to rotate at a speed ranged between 30 and 300 rpm.

[0031] Fig. 6 is a block diagram of a combination cooling and heating fan structure according to a second preferred embodiment of the present invention. The second preferred embodiment is different from the first one in that the limiting module 61 includes a current-dividing unit 611 and a suppressing unit 613. Since all other

structural parts of the second preferred embodiment, including the starting device 30, the driving device 40 and the heating device 50, are the same as those in the first preferred embodiment, they are not repeatedly described herein.

5 [0032] As shown in Fig. 6, the limiting module 61 mainly includes the current-dividing unit 611 and the suppressing unit 613. The current-dividing unit 611 is electrically connected to processing unit 62, the AC-to-DC converter 63, the regulating unit 64 and the heating device 50. The suppressing unit 613 is electrically connected to the processing unit 62 and the regulating unit 64 for suppressing the regulating unit 64,
10 so that the regulating unit 64 can increase or reduce the rotational speed of the driving device 40 only within the second rotational speed range. In practical application of the combination cooling and heating fan structure 1 according to the second preferred embodiment of the present invention, when the current-dividing unit 611 of the limiting module 61 receives the first control signal, it transmits the external DC power supply to
15 only the regulating unit 64, which controls the driving device 40 to drive the fan blade assembly 70 to rotate within the first rotational speed range. On the other hand, when the processing unit 62 generates the second control signal, the second control signal is sent by the processing unit 62 to both of the current-dividing unit 611 and the suppressing unit 613.

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[0033] When the current-dividing unit 611 receives the second control signal, it transmits the external DC power supply to both of the regulating unit 64 and the heating device 50. Meanwhile, when the suppressing unit 613 receives the second control signal, it suppresses the regulating unit 64, so that the regulating unit 64 drives the driving
25 device 40 to rotate only at a speed within the second rotational speed range, bringing

the fan blade assembly 70 to also rotate within the second rotational speed range.

[0034] Referring to Figs. 7 and 8. A combination cooling and heating fan structure 1 according to a third preferred embodiment of the present invention is different from the first one in that the starting device 30 thereof further includes a wireless receiver module 80, which is electrically connected to the processing unit 62. Since all other structural parts of the third preferred embodiment, including the driving device 40, the heating device 50 and the electronic device 60, are the same as those in the first preferred embodiment, they are not repeatedly described herein.

[0035] As shown in Figs. 7 and 8, the wireless receiver module 80 is wirelessly connected to a portable mobile device 81, which is able to generate and transmit the driving start signal and the heating start signal to the wireless receiver module 80. The wireless receiver module 80 in turn transmits the received driving start signal and heating start signal to the processing unit 62. The processing unit 62 will determine whether only the driving start signal is received or both of the driving start signal and the heating start signal are received. In the case only the driving start signal is received, the processing unit 62 generates the first control signal; and, in the case both the driving and the heating start signals are received, the processing unit 62 generates the second control signal. Thereafter, the current-dividing unit 611 of the limiting module 61 transmits the external DC power supply only to the regulating unit 64, in the case the first control signal is generated and transmitted to the current-dividing unit 611, or to both of the speed-limiting unit 612 and the heating unit 50, in the case the second control signal is generated and transmitted to the current-dividing unit 611.

[0036] Fig. 9 is a block diagram of a combination cooling and heating fan structure 1 according to a fourth preferred embodiment of the present invention. The fourth preferred embodiment is different from the first one in that it further includes a sensing device 90 electrically connected to the processing unit 62. Since all other structural parts of the fourth preferred embodiment, including the starting device 30, the driving device 40, the heating device 50 and the electronic device 60, are the same as those in the first preferred embodiment, they are not repeatedly described herein.

[0037] The sensing device 90 can detect different physical quantities in an indoor environment. When the sensing device 90 detects any specific physical quantity is higher or lower than a preset value, the processing unit 62 is caused to generate a stop signal to the current-dividing unit 611. When receiving the stop signal, the current-dividing unit 611 stops transmitting the external power supply to the speed-limiting unit 612 and the heating device 50.

[0038] In a preferred embodiment, the sensing device 90 includes a temperature sensor unit 91 for detecting an indoor temperature, and a humidity sensor unit 92 for detecting an indoor humidity level. In practical application of the combination cooling and heating fan structure 1 according to the fourth preferred embodiment of the present invention, when the fan blade assembly 70 blows hot air to an indoor environment to thereby increase the temperature of the indoor environment, the temperature sensor unit 91 and the humidity sensor unit 92 act to detect the temperature and the humidity level of the indoor environment, respectively. When any one of the temperature sensor unit 91 and the humidity sensor unit 92 detects an indoor temperature that is too high or an indoor humidity level that is too low relative to a corresponding preset value, the

processing unit 62 generates a stop signal to the current-dividing unit 611. When receiving the stop signal, the current-dividing unit 611 stops transmitting the external power supply to the speed-limiting unit 612 and the heating device 50.

5 [0039] Referring to Figs. 10 and 11. A combination cooling and heating fan structure 1 according to a fifth preferred embodiment is different from the first one in that the starting device 30 thereof further includes an oscillating start switch 33 electrically connected to the processing unit 62 and that the driving device 40 thereof further includes an oscillating assembly 41. Since all other structural parts of the fifth preferred
10 embodiment are the same as those in the first preferred embodiment, they are not repeatedly described herein. In practical application of the fifth preferred embodiment, when the oscillating start switch 33 is pushed, it generates an oscillating start signal to the processing unit 62, which further directly transmits the oscillating start signal to the oscillating assembly 41 of the driving device 40, so that the oscillating assembly 41
15 causes the housing 20 to oscillate upward and downward. Meanwhile, the fan blade assembly 70 is brought to oscillate upward and downward synchronously with the housing 20. It is understood that the upward and downward oscillation of the housing 20 caused by the oscillating assembly 41 is only illustrative. In other operable embodiments, the fan blade assembly 70 can be directly brought by the oscillating
20 assembly 41 to oscillate up and down in the receiving space 21.

[0040] The present invention has been described with some preferred embodiments thereof and it is understood that many changes and modifications in the described embodiments can be carried out without departing from the scope of the invention that
25 is intended to be limited only by the appended claims.

CLAIMS:

1. A combination cooling and heating fan structure, comprising a driving device for driving a fan blade assembly to rotate and a heating device for producing hot air; the driving device and the heating device being electrically connected to an electronic device, the electronic device controlling the driving device to rotate within a preset first rotational speed range and accordingly, drive the fan blade assembly to rotate and cause cold convection; and the electronic device also selectively controlling the heating device to produce the hot air; wherein:
the electronic device includes a limiting module capable of limiting the driving device to rotate at a speed within a second rotational speed range, greater than zero, that is smaller than the first rotational speed range, when the driving device and the heating device are started at a same time, whereby the fan blade assembly blows the hot air to cause heat convection;
wherein the electronic device includes:
a regulating unit electrically connected to the driving device for controlling the driving device to rotate at a speed within the first rotational speed range;
a speed-limiting unit electrically connected to the driving device for controlling the driving device to rotate at a speed within the second rotational speed range;
a current-dividing unit electrically connected to the regulating unit, the speed-limiting unit and the heat device for selectively transmitting an external power supply to only the regulating unit or to both of the speed-limiting unit and the heating device; and
a processing unit electrically connected to the current-dividing unit for controlling the current-dividing unit to transmit the external power supply to only the regulating

unit or to both of the speed-limiting unit and the heating device, the processing unit generates a first control signal to the current-dividing unit when only the driving device is started, so that the current-dividing unit having received the first control signal transmits the external power supply to only the regulating unit; and wherein the processing unit generates a second control signal to the current-dividing unit when both of the driving device and the heating device are started, so that the current-dividing unit having received the second control signal transmits the external power supply to both of the speed-limiting unit and the heating device; and wherein the regulating unit, speed-limiting unit, the current-dividing unit and processing unit together form the limiting module.

2. The combination cooling and heating fan structure as claimed in claim 1, wherein the current-dividing unit and the processing unit together constitute a microprocessor.
3. The combination cooling and heating fan structure as claimed in claim 1, wherein the first and the second rotational speed range have an identical low limit while the first rotational speed range has a high limit larger than a high limit of the second rotational speed range.

4. The combination cooling and heating fan structure as claimed in claim 1, further comprising a wireless receiver module electrically connected to the electronic device; the wireless receiver module being wirelessly connected to a portable mobile device, so that the portable mobile device can start the driving device and the heating device via the wireless receiver module.
5. The combination cooling and heating fan structure as claimed in claim 1, further comprising a sensing device electrically connected to the electronic device for detecting different physical quantities in an indoor environment; and the electronic device being caused to turn off the driving device and the heating device when the sensing device detects any specific physical quantity is higher or lower than a preset value.
6. The combination cooling and heating fan structure as claimed in claim 5, wherein the sensing device includes a temperature sensor unit for detecting an indoor temperature and a humidity sensor unit for detecting an indoor humidity level; and the electronic device stopping the driving device and the heating device from operating when the temperature sensor unit detects an indoor temperature that is too high relative to a corresponding preset value or the humidity sensor unit detects an indoor humidity level that is too low relative to a corresponding preset value.

7. The combination cooling and heating fan structure as claimed in claim 1, wherein the driving device includes an oscillating assembly for causing the fan blade assembly to oscillate, and the electronic device being able to selectively control the oscillating assembly to oscillate the fan blade assembly.
8. A combination cooling and heating fan structure, comprising a driving device for driving a fan blade assembly to rotate and a heating device for producing hot air; the driving device and the heating device being electrically connected to an electronic device, the electronic device controlling the driving device to rotate within a preset first rotational speed range and accordingly, drive the fan blade assembly to rotate and cause cold convection; and the electronic device also selectively controlling the heating device to produce the hot air; where in:
the electronic device includes a limiting module capable of limiting the driving device to rotate at a speed within a second rotational speed range, greater than zero, that is smaller than the first rotational speed range, when the driving device and the heating device are started at a same time, whereby the fan blade assembly blows the hot air to cause heat convection;
wherein the electronic device includes:
a regulating unit electrically connected to the driving device for controlling the driving device to rotate at a speed within the first rotational speed range;
a suppressing unit electrically connected to the regulating unit for suppressing the regulating unit, so that the regulating unit drives the driving device to rotate only at a speed within the second rotational speed range.

a current-dividing unit electrically connected to the regulating unit and the heating device for selectively transmitting an external power supply to only the regulating unit or to both of the regulating unit and the heating device; and

a processing unit electrically connected to the current-dividing unit and the suppressing unit for controlling the current-dividing unit to transmit the external power supply to only the regulating unit or to both of the regulating unit and the heating device, the processing unit generates a first control signal to the current-dividing unit, so that the current-dividing unit starts only the driving device via the regulating unit and limits the driving device to rotate at a speed within the first rotational speed range; and wherein the processing unit generates a second control signal to both of the current-dividing unit and the suppressing unit, so that the driving unit rotates at a speed within the second rotational speed range and the heating device is driven to produce hot air; and

wherein the regulating unit, speed-limiting unit, the current-dividing unit and processing unit together form the limiting module.

9. The combination cooling and heating fan structure as claimed in claim 8, wherein the current-dividing unit and the processing unit together constitute a microprocessor.
10. The combination cooling and heating fan structure as claimed in claim 8, wherein the first and the second rotational speed range have an identical low limit while the first rotational speed range has a high limit larger than that of the second rotational speed range.

11. The combination cooling and heating fan structure as claimed in claim 8, further comprising a wireless receiver module electrically connected to the electronic device; the wireless receiver module being wirelessly connected to a portable mobile device, so that the portable mobile device can start the driving device and the heating device via the wireless receiver module.
12. The combination cooling and heating fan structure as claimed in claim 8, further comprising a sensing device electrically connected to the electronic device for detecting different physical quantities in an indoor environment; and the electronic device being caused to turn off the driving device and the heating device when the sensing device detects any specific physical quantity is higher or lower than a preset value.
13. The combination cooling and heating fan structure as claimed in claim 2, wherein the sensing device includes a temperature sensor unit for detecting an indoor temperature and a humidity sensor unit for detecting an indoor humidity level; and the electronic device stopping the driving device and the heating device from operating when the temperature sensor unit detects an indoor temperature that is too high relative to a corresponding preset value or the humidity sensor unit detects an indoor humidity level that is too low relative to a corresponding preset value.

14. The combination cooling and heating fan structure as claimed in claim 8, wherein the driving device includes an oscillating assembly for causing the fan blade assembly to oscillate, and the electronic device being able to selectively control the oscillating assembly to oscillate the fan blade assembly.

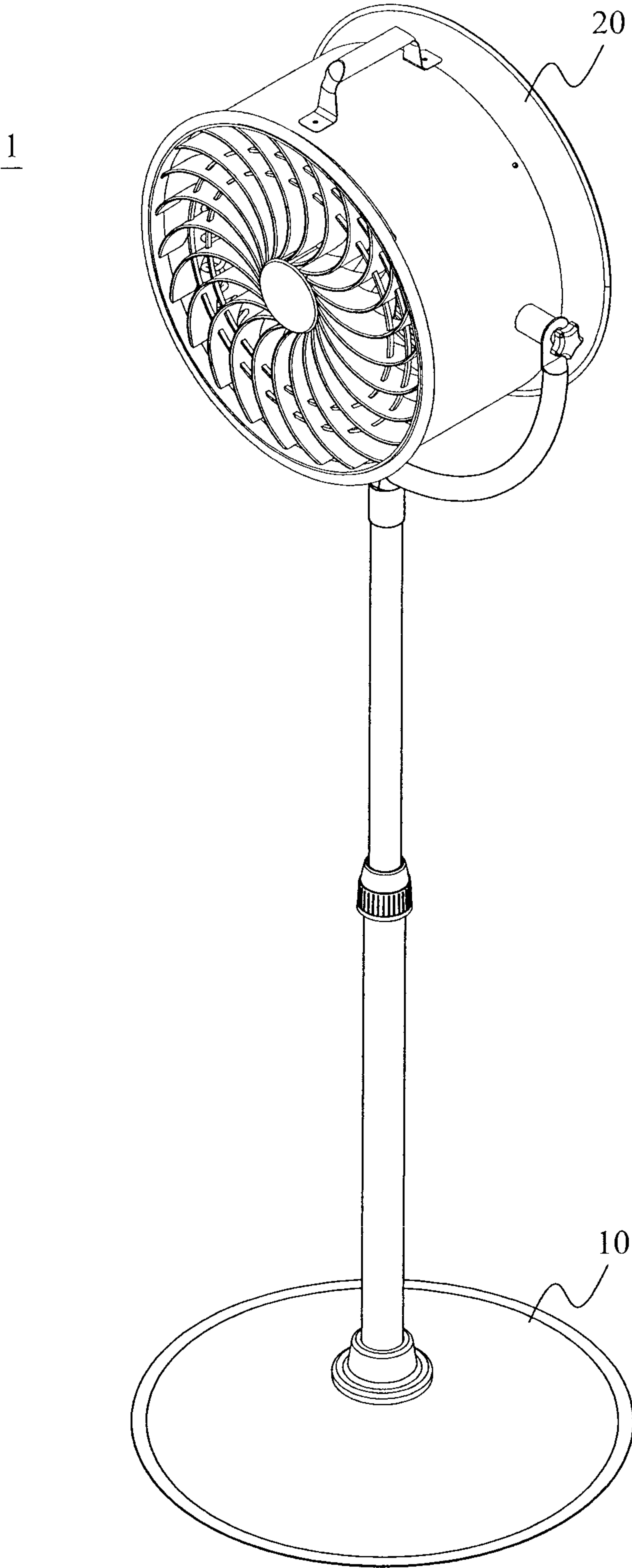


FIG. 1

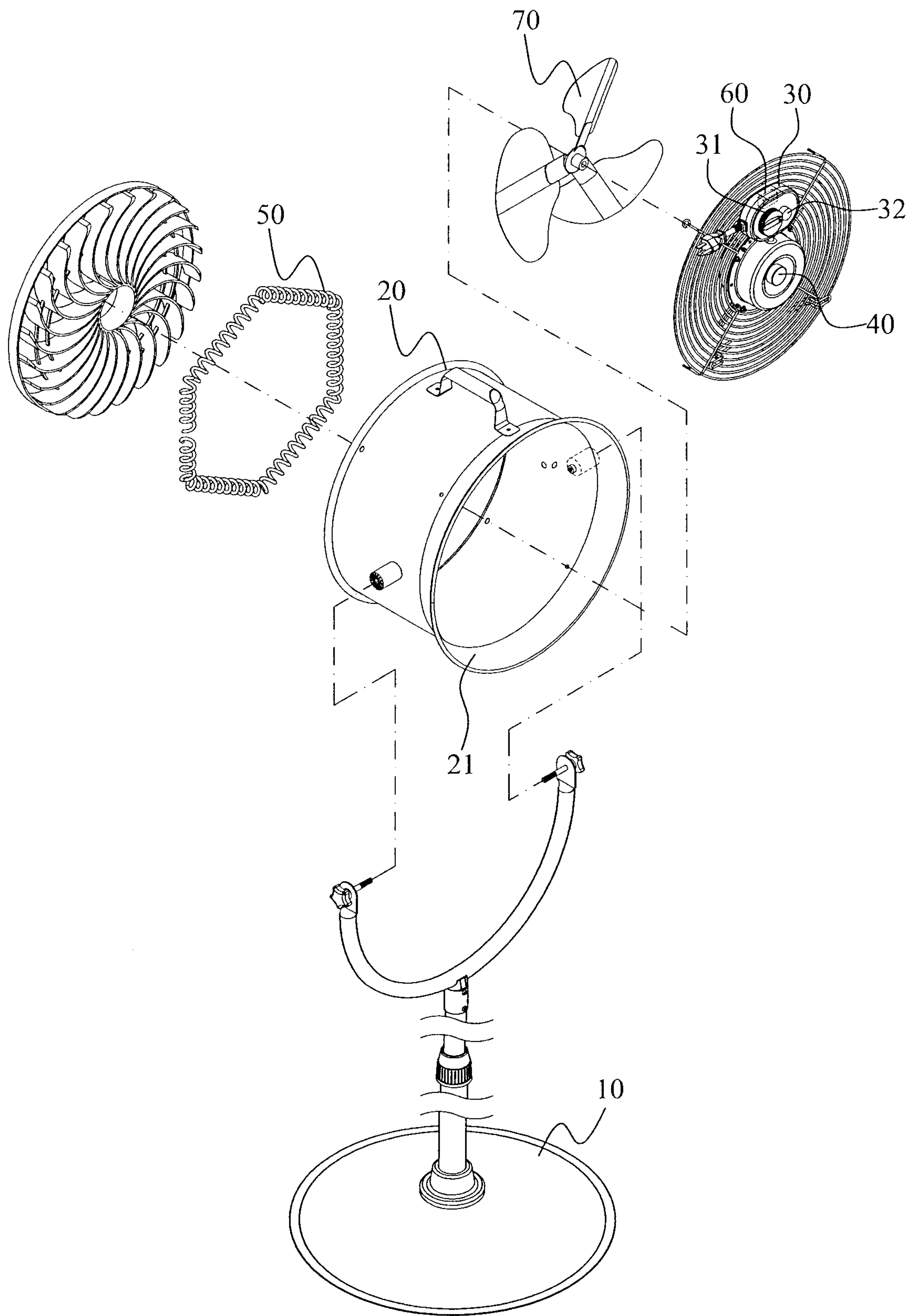


FIG. 2

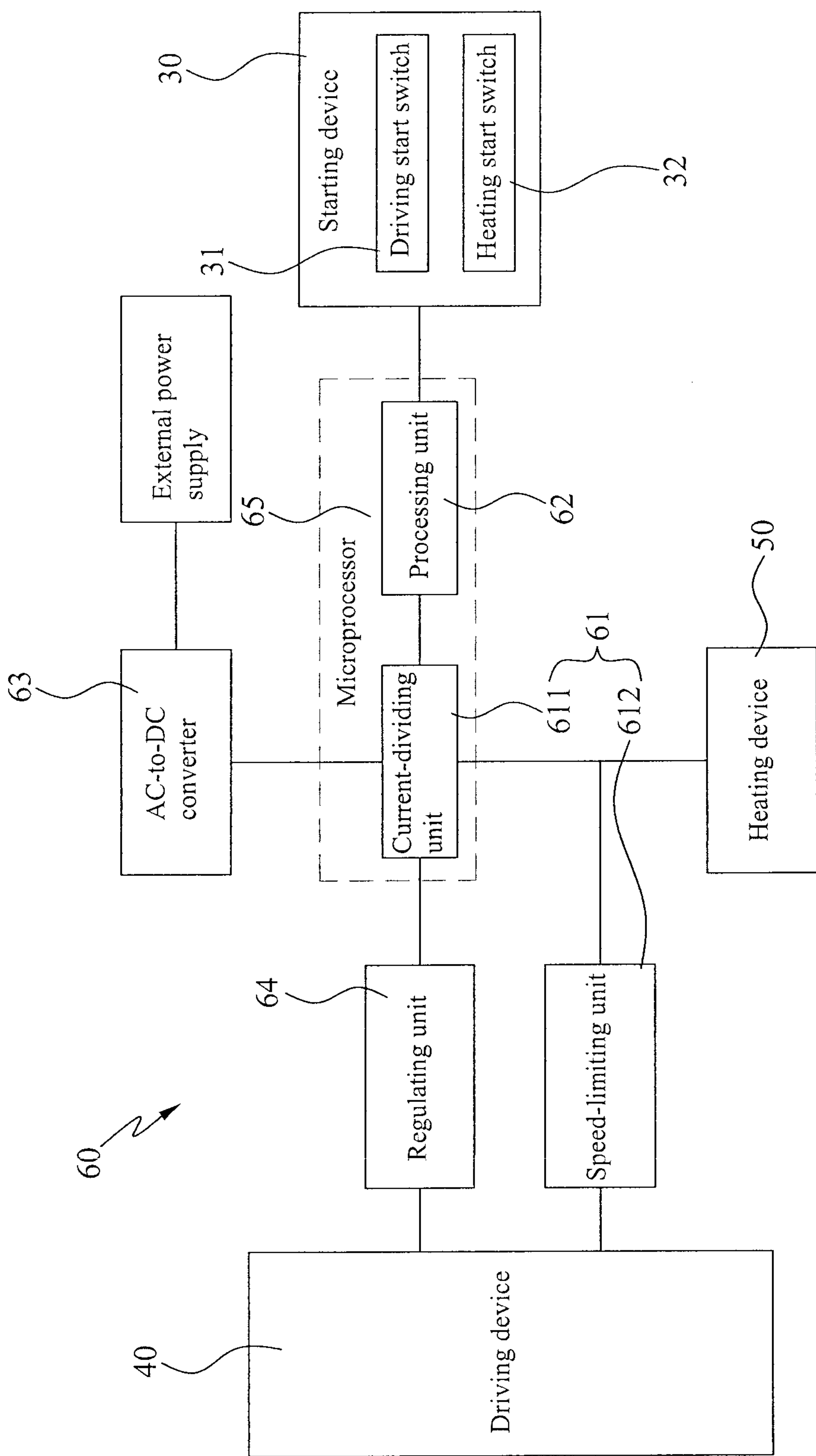


FIG. 3

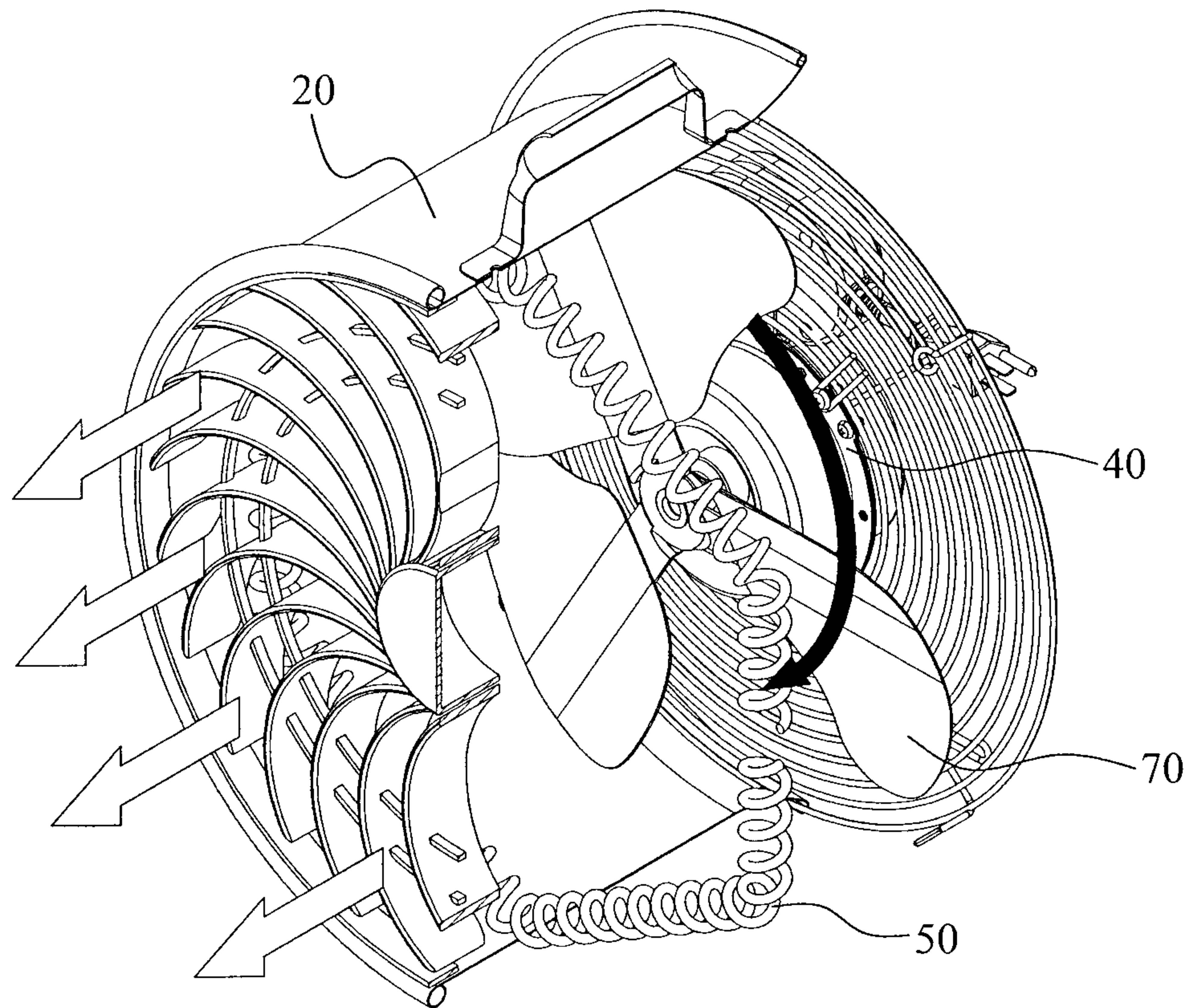


FIG. 4

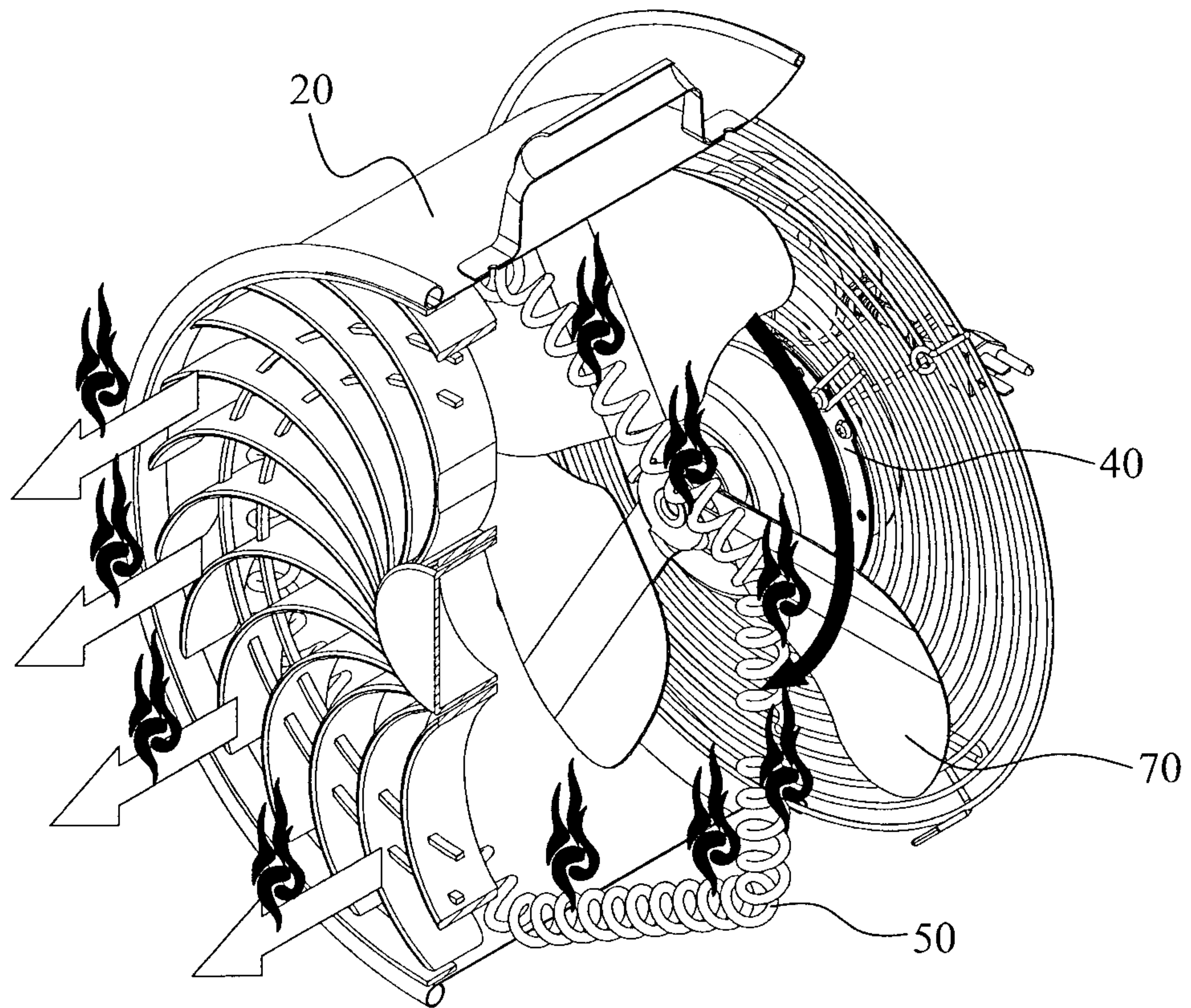


FIG. 5

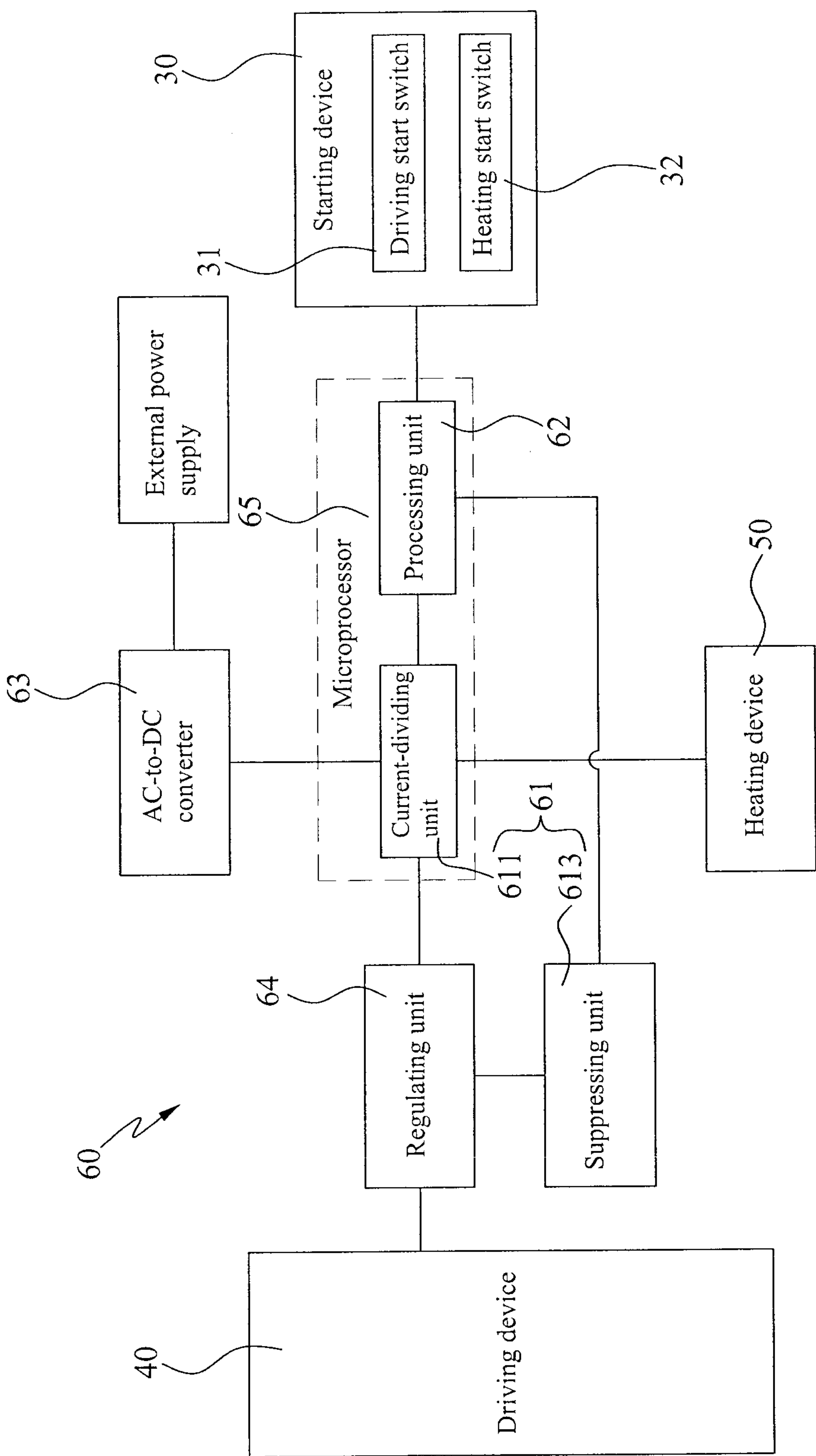


FIG. 6

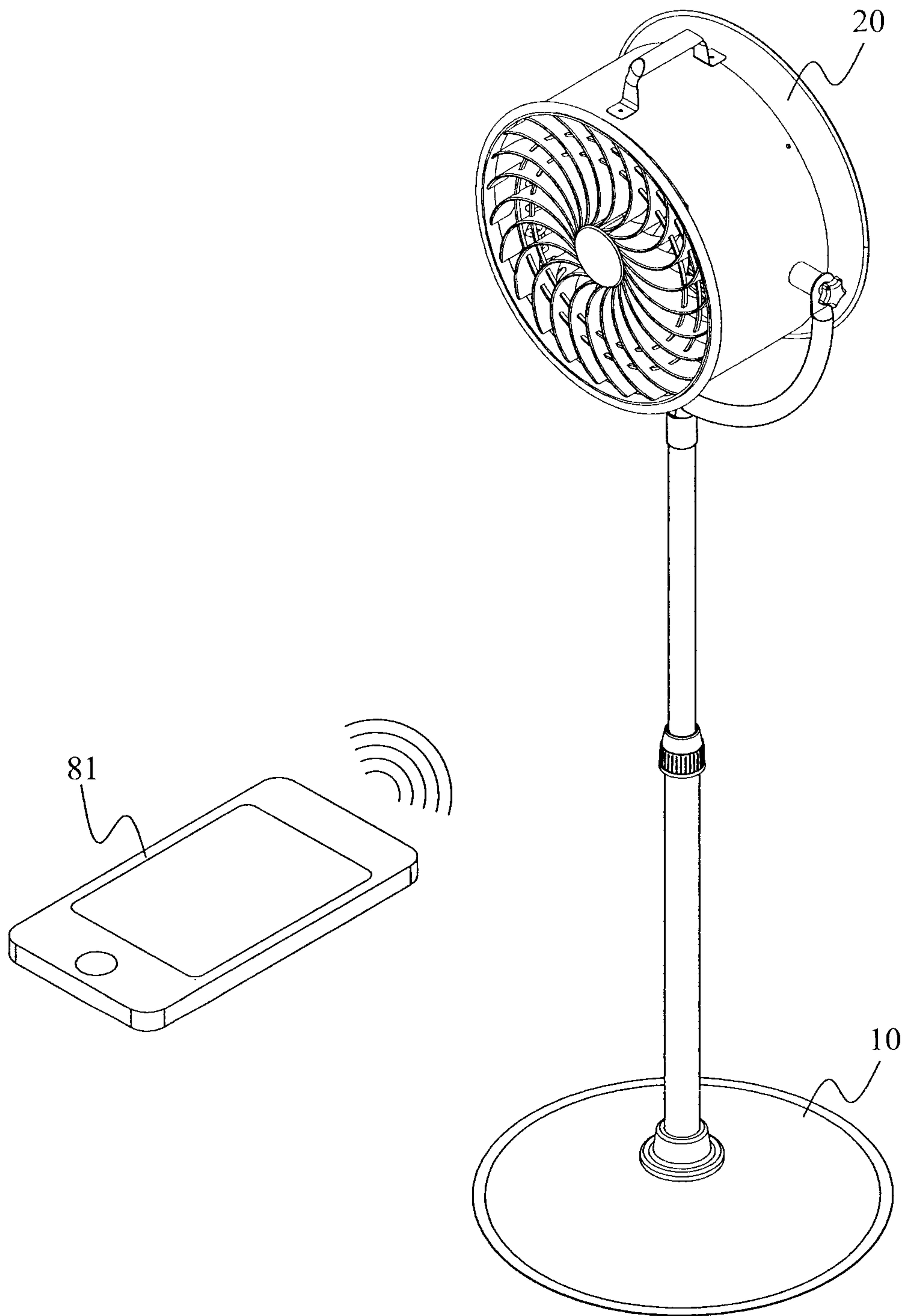


FIG. 7

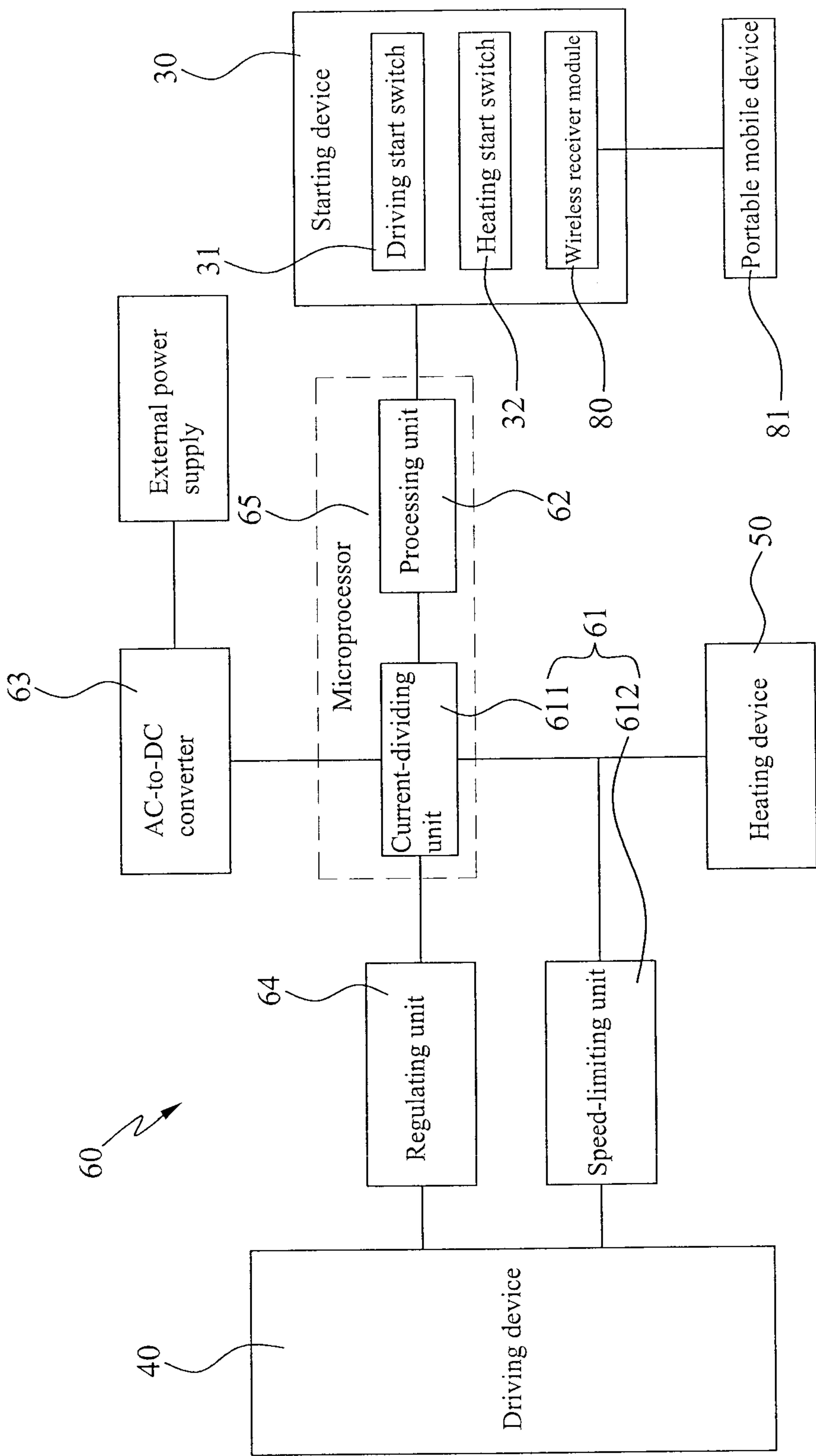


FIG. 8

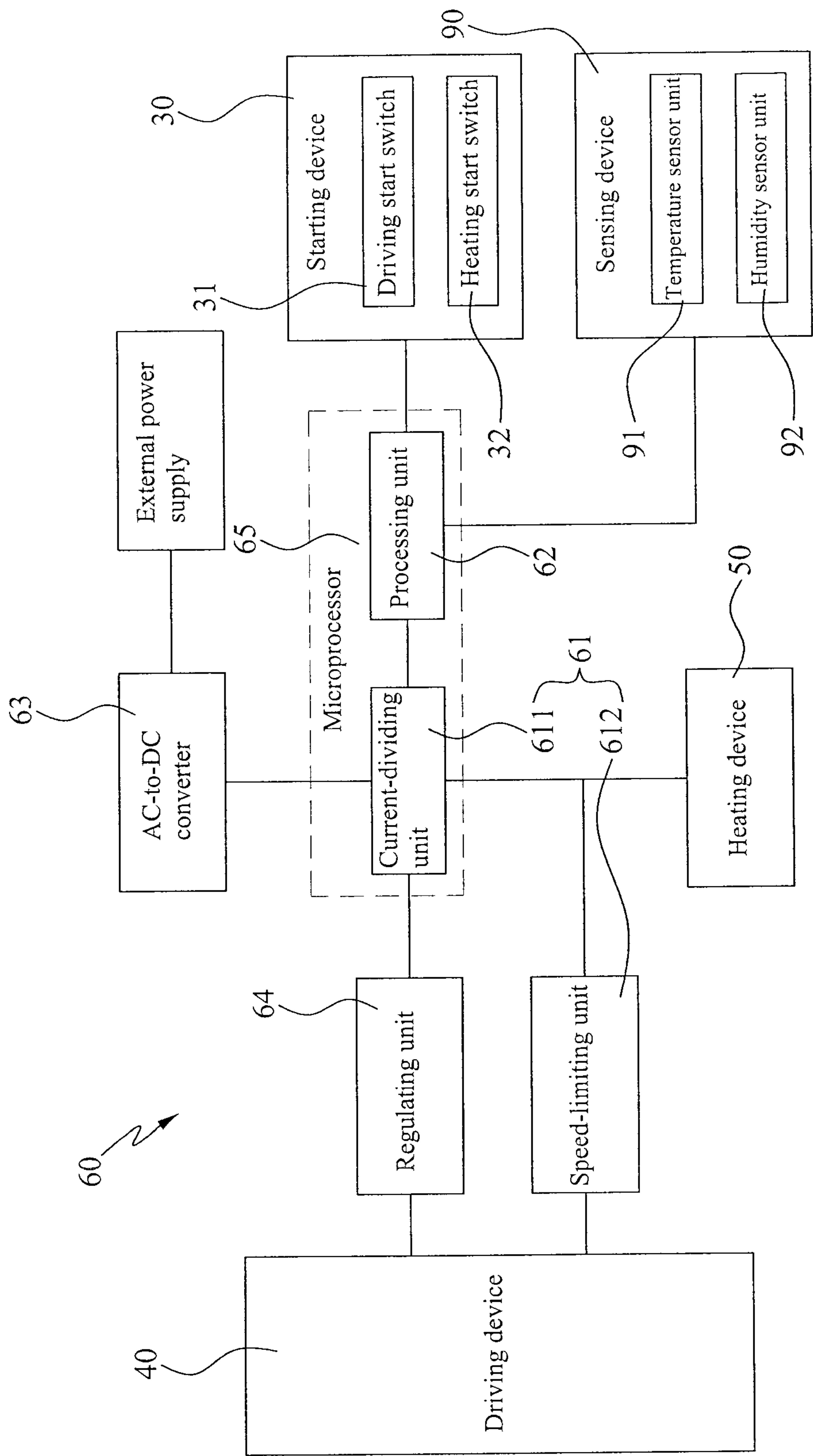


FIG. 9

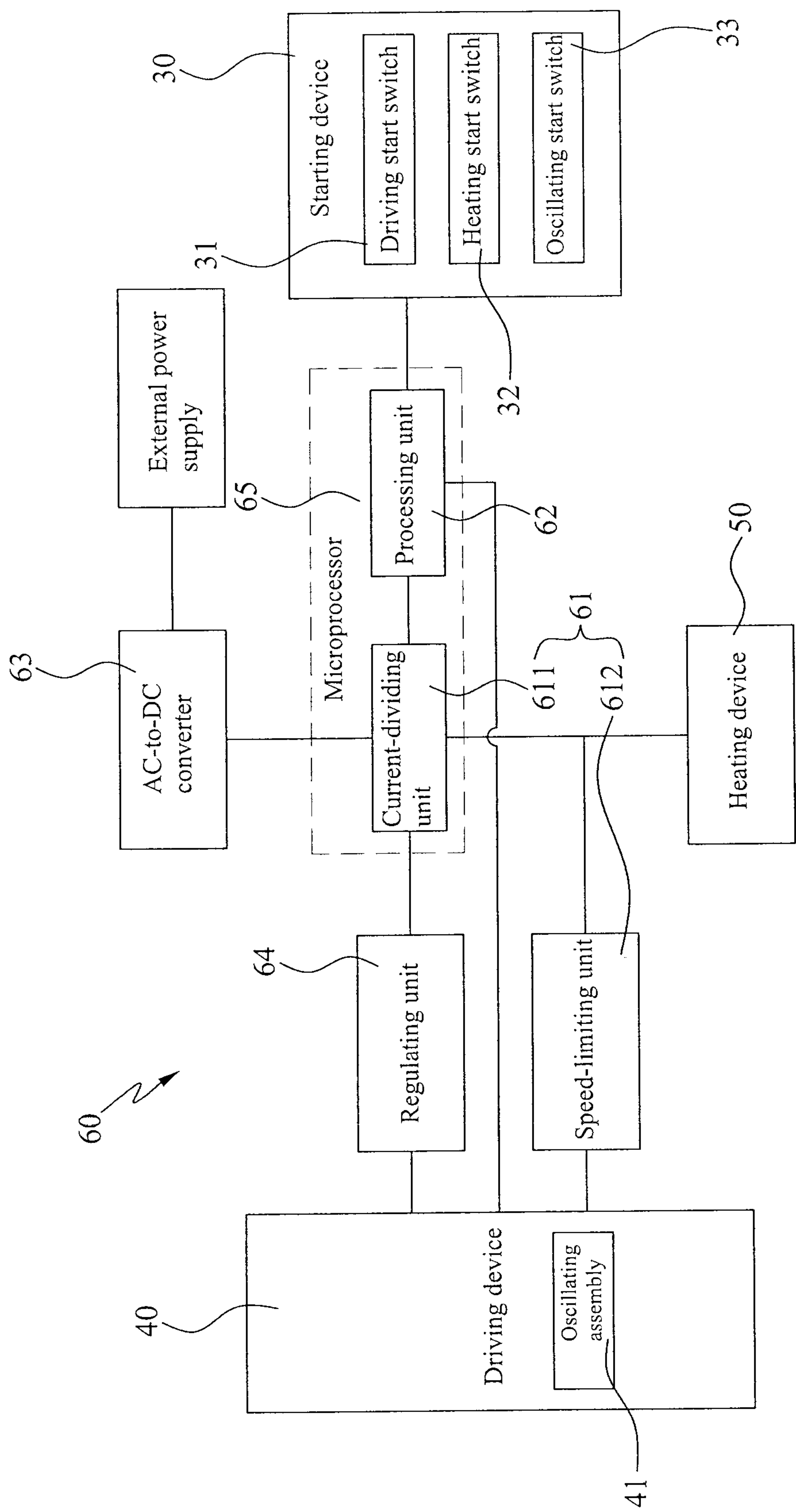


FIG. 10

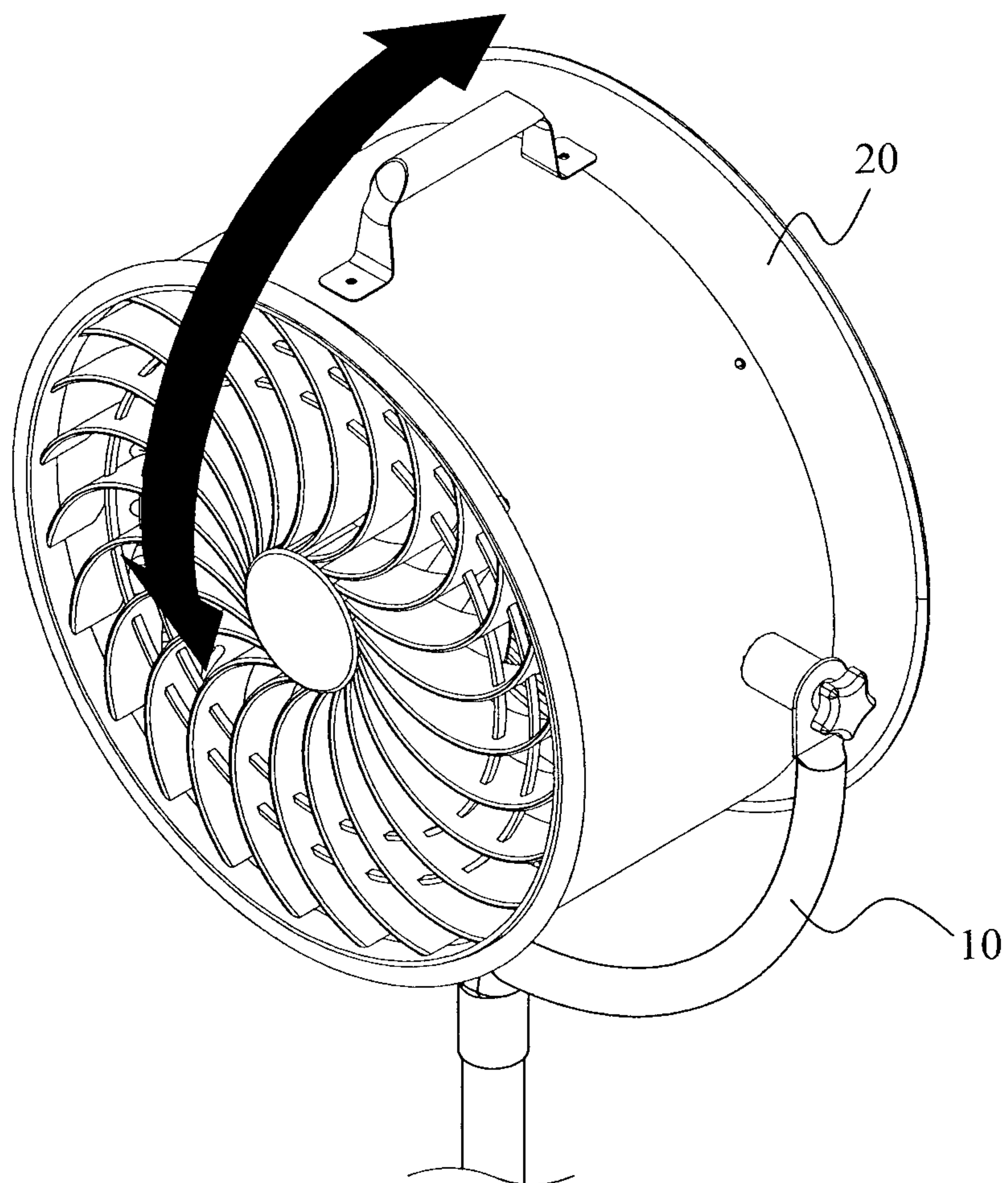


FIG. 11

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